

1. (Amended) A method of compensating a radiation sensor for changes in at least one operational characteristic of the sensor due to a temperature variation of the sensor, comprising an act of:

a) dynamically adjusting at least one calibration parameter associated with the radiation sensor based on the temperature variation of the sensor.

6. (Amended) An apparatus, comprising:

a controller to compensate a radiation sensor for changes in at least one operational characteristic of the sensor due to a temperature variation of the sensor, the controller configured to dynamically adjust at least one calibration parameter associated with the radiation sensor based on the temperature variation of the sensor.

Please add new claims 13-66 as follows:

13. (New) The method of claim 1, wherein the sensor includes a plurality of radiation detectors, wherein the at least one operational characteristic of the sensor that changes due to the temperature variation of the sensor includes at least one of an offset error variation and a gain variation associated with the plurality of radiation detectors, wherein the at least one calibration parameter associated with the sensor includes at least one of an offset error value for each radiation detector and a gain value for each radiation detector, and wherein the act a) includes an act of:

dynamically adjusting at least one of at least one offset error value and at least one gain value based on the temperature variation of the sensor to compensate for a respective at least one of the offset error variation and the gain variation.

14. (New) The method of claim 13, further comprising an act of:

applying the dynamically adjusted at least one calibration parameter to at least one output signal of the radiation sensor.

15. (New) The method of claim 1, wherein the act a) comprises an act of:

applying at least one compensation function to the at least one calibration parameter to compensate for the changes in the at least one operational characteristic of the sensor due to the temperature variation of the sensor.

16. (New) The method of claim 15, wherein the at least one compensation function includes a linear approximation of the changes in the at least one operational characteristic of the sensor due to the temperature variation of the sensor.

17. (New) The method of claim 15, wherein the at least one compensation function includes an interpolated piece-wise linear approximation of the changes in the at least one operational characteristic of the sensor due to the temperature variation of the sensor.

18. (New) The method of claim 15, wherein the at least one compensation function includes a nonlinear function representing the changes in the at least one operational characteristic of the sensor due to the temperature variation of the sensor.

19. (New) The method of any of claims 16 - 18, further comprising an act of:  
b) allowing a temperature of the radiation sensor to freely vary over a significant range.

20. (New) The method of claim 19, wherein the act b) comprises an act of:  
applying essentially no thermal stabilization to the radiation sensor.

21. (New) The method of claim 1, further comprising an act of:  
b) allowing a temperature of the radiation sensor to freely vary over a significant range.

22. (New) The method of claim 21, wherein the act b) comprises an act of:  
applying essentially no thermal stabilization to the radiation sensor.

23. (New) The method of claim 21, further comprising an act of:  
c) thermally stabilizing the radiation sensor at a plurality of different temperatures based at least in part on an ambient temperature in proximity of the radiation sensor.

24. (New) The method of claim 23, wherein the act c) further comprises an act of:  
selecting the plurality of different temperatures from within a temperature range spanning approximately 100 degrees Celsius.
25. (New) The method of claims 24, wherein the act c) further comprises an act of:  
selecting the plurality of different temperatures from within a temperature range of approximately -40 degrees Celsius to approximately +60 degrees Celsius.
26. (New) The method of claim 23, wherein the plurality of different temperatures are selected from within a temperature range, and wherein the act c) further comprises acts of:  
dividing the temperature range into a plurality of sub-ranges; and  
selecting one temperature from within each sub-range as a predetermined stabilization temperature so as to approximately minimize a power consumption over each sub-range of a thermal stabilization device used for the step c).
27. (New) The method of claim 26, wherein the act of selecting one temperature from within each sub-range includes act of:  
determining a center temperature within each sub-range; and  
adding a predetermined number of degrees Celsius to the center temperature within each sub-range to determine the predetermined stabilization temperature within each sub-range.
28. (New) The method of claim 27, wherein the act of adding a predetermined number of degrees Celsius includes an act of adding approximately 10 degrees Celsius to the center temperature within each sub-range to determine the predetermined stabilization temperature within each sub-range.
29. (New) The method of claim 23, wherein the plurality of different temperatures includes at least three different temperatures, and wherein the act c) comprises an act of:  
thermally stabilizing the radiation sensor at at least three different temperatures based at least in part on the ambient temperature in proximity of the radiation sensor.

30. (New) The method of claim 23, wherein the act c) comprises acts of:  
measuring the ambient temperature in proximity of the radiation sensor;  
dynamically selecting one of a plurality of different predetermined stabilization temperatures in a vicinity of the measured ambient temperature; and  
thermally stabilizing the radiation sensor at the selected one of the plurality of different predetermined stabilization temperatures.

B3 31. (New) The method of claim 23, wherein the act a) comprises an act of dynamically adjusting the at least one calibration parameter based on the respective different temperatures at which the radiation sensor is thermally stabilized.

32. (New) The method of claim 31, wherein the radiation sensor includes a plurality of radiation detectors, wherein the at least one calibration parameter includes a plurality of offset maps and a plurality of gain maps, each offset map including an offset error value for each radiation detector at a different one temperature of the respective different temperatures and each gain map including a gain value for each radiation detector at a different one temperature of the respective different temperatures, and wherein the act a) comprises an act of:  
selecting one offset map of the plurality of offset maps and one gain map of the plurality of gain maps based on a corresponding one of the respective different temperatures at which the radiation sensor is thermally stabilized.

33. (New) The method of claim 21, further comprising an act of:  
d) dynamically adjusting at least one operating parameter associated with the radiation sensor based on the temperature variation of the sensor.

34. (New) The method of claim 33, wherein the at least one operating parameter associated with the sensor includes at least one of a DC bias voltage applied to the sensor, a DC bias current applied to the sensor, and an AC bias waveform applied to the sensor, and wherein the act d) comprises an act of:

dynamically adjusting at least one of the DC bias voltage applied to the sensor, the DC bias current applied to the sensor, and the AC bias waveform applied to the sensor based on the temperature variation of the sensor.

35. (New) The method of claim 34, wherein the act d) comprises an act of:  
dynamically adjusting the DC bias voltage and the DC bias current applied to the sensor so as to maintain an essentially constant bias power.

36. (New) The method of claim 34, wherein the act d) comprises an act of:  
dynamically adjusting an amplitude of the AC bias waveform applied to the sensor based on the temperature variation of the sensor.

37. (New) The apparatus of claim 6, wherein the sensor includes a plurality of radiation detectors, wherein the at least one operational characteristic of the sensor that changes due to the temperature variation of the sensor includes at least one of an offset error variation and a gain variation associated with the plurality of radiation detectors, wherein the at least one calibration parameter associated with the sensor includes at least one of an offset error value for each radiation detector and a gain value for each radiation detector, and wherein:

the controller is configured to dynamically adjust at least one of at least one offset error value and at least one gain value based on the temperature variation of the sensor to compensate for a respective at least one of the offset error variation and the gain variation.

38. (New) The apparatus of claim 37, wherein the controller is further configured to apply the dynamically adjusted at least one calibration parameter to at least one output signal of the radiation sensor.

39. (New) The apparatus of claim 6, wherein the controller is configured to apply at least one compensation function to the at least one calibration parameter to compensate for the changes in the at least one operational characteristic of the sensor due to the temperature variation of the sensor.

40. (New) The apparatus of claim 39, wherein the at least one compensation function includes a linear approximation of the changes in the at least one operational characteristic of the sensor due to the temperature variation of the sensor.

41. (New) The apparatus of claim 39, wherein the at least one compensation function includes an interpolated piece-wise linear approximation of the changes in the at least one operational characteristic of the sensor due to the temperature variation of the sensor.

B3 42. (New) The apparatus of claim 39, wherein the at least one compensation function includes a nonlinear function representing the changes in the at least one operational characteristic of the sensor due to the temperature variation of the sensor.

43. (New) The apparatus of any of claims 40 to 42, wherein the apparatus is configured to allow a temperature of the radiation sensor to freely vary over a significant range.

44. (New) The apparatus of claim 43, wherein the apparatus does not include a thermal stabilization device to thermally stabilize the radiation sensor.

45. (New) The apparatus of claim 6, wherein the apparatus is configured to allow a temperature of the radiation sensor to freely vary over a significant range.

46. (New) The apparatus of claim 45, wherein the apparatus does not include a thermal stabilization device to thermally stabilize the radiation sensor.

47. (New) The apparatus of claim 45, further comprising at least one thermal stabilization device to thermally stabilize the radiation sensor, wherein the controller is configured to control the at least one thermal stabilization device to thermally stabilize the radiation sensor at a plurality of different temperatures based at least in part on an ambient temperature in proximity of the radiation sensor.

48. (New) The apparatus of claim 47, wherein the controller is configured to select the plurality of different temperatures from within a temperature range spanning approximately 100 degrees Celsius.

49. (New) The apparatus of claim 48, wherein the controller is configured to select the plurality of different temperatures from within a temperature range of approximately -40 degrees Celsius to approximately +60 degrees Celsius.

B3 50. (New) The apparatus of claim 47, wherein the controller is configured to select the plurality of different temperatures from within a temperature range, and wherein the controller is further configured to:

divide the temperature range into a plurality of sub-ranges; and  
select one temperature from within each sub-range as a predetermined stabilization temperature so as to approximately minimize a power consumption over each sub-range of the at least one thermal stabilization device.

51. (New) The apparatus of claim 50, wherein the controller is further configured to:  
determine a center temperature within each sub-range; and  
add a predetermined number of degrees Celsius to the center temperature within each sub-range to determine the predetermined stabilization temperature within each sub-range.

52. (New) The apparatus of claim 51, wherein the controller is configured to add approximately 10 degrees Celsius to the center temperature within each sub-range to determine the predetermined stabilization temperature within each sub-range.

53. (New) The apparatus of claim 47, wherein the plurality of different temperatures includes at least three different temperatures, and wherein the controller is configured to control the at least one thermal stabilization device to thermally stabilize the radiation sensor at at least three different temperatures based at least in part on the ambient temperature in proximity of the radiation sensor.

54. (New) The apparatus of claim 47, wherein the controller is further configured to:  
measure the ambient temperature in proximity of the radiation sensor;  
dynamically select one of a plurality of different predetermined stabilization temperatures  
in a vicinity of the measured ambient temperature; and  
control the at least one thermal stabilization device to thermally stabilize the radiation  
sensor at the selected one of the plurality of different predetermined stabilization temperatures.

55. (New) The apparatus of claim 47, wherein the controller is configured to dynamically  
adjust the at least one calibration parameter based on the respective different temperatures at  
which the radiation sensor is thermally stabilized.

56. (New) The apparatus of claim 55, wherein the radiation sensor includes a plurality of  
radiation detectors, wherein the at least one calibration parameter includes a plurality of offset  
maps and a plurality of gain maps, each offset map including an offset error value for each  
radiation detector at a different one temperature of the respective different temperatures and each  
gain map including a gain value for each radiation detector at a different one temperature of the  
respective different temperatures, and wherein the controller is configured to select one offset  
map of the plurality of offset maps and one gain map of the plurality of gain maps based on a  
corresponding one of the respective different temperatures at which the radiation sensor is  
thermally stabilized.

57. (New) The apparatus of claim 45, wherein the controller is further configured to  
dynamically adjust at least one operating parameter associated with the radiation sensor based on  
the temperature variation of the sensor.

58. (New) The apparatus of claim 57, wherein the at least one operating parameter associated  
with the sensor includes at least one of a DC bias voltage applied to the sensor, a DC bias current  
applied to the sensor, and an AC bias waveform applied to the sensor, and wherein the controller  
is configured to dynamically adjust at least one of the DC bias voltage applied to the sensor, the  
DC bias current applied to the sensor, and the AC bias waveform applied to the sensor based on  
the temperature variation of the sensor.



59. (New) The apparatus of claim 58, wherein the controller is further configured to dynamically adjust the DC bias voltage and the DC bias current applied to the sensor so as to maintain an essentially constant bias power.

60. (New) The apparatus of claim 58, wherein the controller is further configured to dynamically adjust an amplitude of the AC bias waveform applied to the sensor based on the temperature variation of the sensor.

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61. (New) A method of compensating a radiation sensor for changes in at least one operational characteristic of the sensor due to a temperature variation of the sensor, comprising acts of:

a) allowing a temperature of the radiation sensor to freely vary over a significant range;  
and

b) dynamically adjusting at least one of at least one operating parameter associated with the radiation sensor and at least one calibration parameter associated with the radiation sensor based on the freely varying temperature of the sensor.

62. (New) A method of compensating a radiation sensor for changes in at least one operational characteristic of the sensor due to a temperature variation of the sensor, comprising acts of:

a) applying essentially no thermal stabilization to the radiation sensor so as to allow a temperature of the radiation sensor to freely vary; and

b) dynamically adjusting at least one of at least one operating parameter associated with the radiation sensor and at least one calibration parameter associated with the radiation sensor based on the freely varying temperature of the sensor.

63. (New) A method of compensating a radiation sensor for changes in at least one operational characteristic of the sensor due to a temperature variation of the sensor, comprising acts of:

a) thermally stabilizing the radiation sensor at a plurality of different temperatures based at least in part on an ambient temperature in proximity of the radiation sensor; and

b) dynamically adjusting at least one of at least one operating parameter associated with the radiation sensor and at least one calibration parameter associated with the radiation sensor based on the respective different temperatures at which the radiation sensor is thermally stabilized.

64. (New) The method of claim 63, wherein the plurality of different temperatures are selected from within a temperature range, and wherein the act a) further comprises acts of:

dividing the temperature range into a plurality of sub-ranges; and

selecting one temperature from within each sub-range as a predetermined stabilization temperature so as to approximately minimize a power consumption over each sub-range of a thermal stabilization device used for the step a).

65. (New) A method of compensating a radiation sensor for changes in at least one operational characteristic of the sensor due to a temperature variation of the sensor, comprising an act of:

dynamically adjusting a DC bias voltage and a DC bias current applied to the sensor, based on the temperature variation of the sensor, so as to maintain an essentially constant bias power consumed by the radiation sensor.

66. (New) A method of compensating a radiation sensor for changes in at least one operational characteristic of the sensor due to a temperature variation of the sensor, comprising an act of:

dynamically adjusting an amplitude of an AC bias waveform applied to the sensor based on the temperature variation of the sensor.